VOYTOVICH, P.A.; TATARENKO, V.A.

Case of poisoning by beryllium. Sud.med. ekspert. 6 no.4: 45-47 O-D'63 (MIRA 16:12)

L 07535-66
ACC NR: AP6007513 SOURCE CODE: UR/0109/66/011/002/0339/0342

42
B

AUTHOR: Vaganov, R. B.; Voytovich, N. N.

ORG: Institute of Radio Engineering and Electronics, AN SSSR (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Irregularities in a diaphragm-type beam guide

SOURCE: Radiotekhnika i elektronika, v. 11, no. 2, 1966, 339-342

TOPIC TAGS: beam waveguide, light pipe, digital computer

ABSTRACT: Propagation of dominant mode in a beam guide equipped with a series of diaphragms, in the visible-light range, is considered (cf. G. Goubau and J. R. Christian, IEEE Trans., 1964, MTT-12, 2, 212). The coefficient of dominant-mode transmission through an imperfect diaphragm is determined. Additional losses due to variations of diameter, tilt, longitudinal and transverse diaphragm offsets and also due to fractures and offsets of the axis were evaluated on a digital computer. It was found that in the case of lines having no sharp fractures or bends, the transverse offsets of the diaphragms cause the greatest losses. A comparison with a confocal beam

UDC: 621.378.325

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ACC NR: AP6007513

guide revealed these points: (1) In the confocal guide, dominant-mode losses are caused by phase distortion, and higher-mode losses, by aperture limitations; (2) Losses due to transversal shift are much higher in the confocal guide than in the diaphragm type. Orig. art. has: 4 figures and 7 formulas.

SUB CODE: 20, 09 / SUBM DATE: 12Apr65 / ORIG REF: 003 / OTH REF: 001

Card 2/2 BLG

85040

18.8300 1530, 1520, 1136 only

S/126/60/010/004/008/023
E193/E483

AUTHORS: Voytovich, R.F. and Lavrenko, V.A.

TITLE: The Effect of Tantalum on High Temperature Oxidation of Niobium

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.4, pp.555-559

TEXT: The kinetics of oxidation of the 17% Nb - 82.5% Ta, 33% Nb - 67% Ta, and 65% Nb - 35% Ta alloys was studied by the gravimetric method. Both recrystallized and plastically deformed (33% reduction in thickness) test pieces (thickness - 0.1 mm, total surface area - 2 cm^2) were used; the experiments were carried out at 500 to 900°C for periods up to 6 h. The results are reproduced graphically in Figs.1 to 4, where the weight increment per unit area at a given temperature is plotted against the time (h), in Fig.5 showing the temperature dependence of the In K (where K is the constant of the parabolic law governing the rate of oxidation of the alloys studied) and in Fig.6, showing the concentration dependence of the oxidation characteristics of these alloys. In general, the rate of oxidation of the plastically deformed alloys was higher than that of the recrystallized specimens.

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S/126/60/010/004/008/023
E193/E483

The Effect of Tantalum on High Temperature Oxidation of Niobium

At temperatures above 700°C the formation of scale was so rapid that the specimens were completely oxidized in less than 2 h. Scale formed at lower temperatures adhered firmly to the unoxidized metal. In the case of the tantalum-rich alloys, some anomalous effects were observed at 900°C. Thus, the weight increment/time curve obtained for these alloys (in the plastically deformed condition) at 900°C was below that obtained at the same temperature for the recrystallized material and below the corresponding curves obtained for both plastically deformed and recrystallized specimens oxidized at 800°C. These effects were attributed to the formation of volatile lower tantalum oxides, mainly TaO; these are more easily formed in the presence of thick scale, since then an oxidation-reduction reaction takes place at the scale/metal interface. The attempts to determine by X-ray diffraction technique the nature of the niobium and tantalum oxides, obtained in the course of the present investigation, were unsuccessful. The process of oxidation of all the alloys studied obeyed the parabolic law in respect to the rate of oxidation, and

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The Effect of Tantalum on High Temperature Oxidation of Niobium

the temperature dependence of K was given by
$K = 0.144 \exp (- 11,900/RT)$ for recrystallized, and
$K = 0.145 \exp (- 10,800/RT)$ for plastically deformed niobium.
The results obtained indicate that addition of tantalum reduces the rate of oxidation of niobium at temperatures below 800°C and accelerates it above this temperature. There are 6 figures and 8 references: 3 Soviet and 5 English.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Cermets and Special Alloys, AS UkrSSR)

SUBMITTED: March 28, 1960

Card 3/3

S/126/60/010/006/010/022
E193/E483

18.1200

AUTHORS: Frantsevich, I.N. and Voytovich, R.F.

TITLE: High-Temperature Oxidation of Refractory Alloys. I. The Tungsten-Titanium Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.6, pp.857-861

TEXT: The object of the investigation, described in the present paper, was to study the kinetics of oxidation of titanium and tungsten-titanium alloys, containing 15, 50 and 75% titanium, at 500, 600, 700, 800 and 900°C. The rate of oxidation of argon-arc melted specimens, homogenized by 35 h vacuum-annealing, was determined by the conventional gravimetric method. The results indicated that whereas small additions of tungsten improve the oxidation resistance of titanium at temperatures up to 700°C, the rate of oxidation of tungsten increases sharply as a result of small additions of titanium. The temperature-dependence of the rate of oxidation of the alloys studied is described by $K = A \exp(-B/RT)$, the values of A and B being tabulated below.

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High-Temperature Oxidation of Refractory Alloys. I. The Tungsten-Titanium Alloys

Comp. wt %	A	B	Temperature Range °C
W - Ti (15%)	7.39	31800	500 - 1000
	1.29×10^{-4}	29800	500 - 700
	1.04×10^{-2}	49000	700 - 900
W - Ti (50%)	2.76×10^{-5}	23800	500 - 700
	6.76×10^{-3}	59600	700 - 900
W - Ti (75%)	3.74×10^{-6}	19900	500 - 700
	1.51×10^{-4}	14900	700 - 900

The results are discussed in the frame of the concepts formulated by Hauffe and Pfeiffer (Ref. 8 and 9). Part II of this study relates to tungsten-zirconium alloys; it is published on pp.682-685 of the same issue. There are 8 figures, 1 table and

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E193/E483

High-Temperature Oxidation of Refractory Alloys. I. The Tungsten-Titanium Alloys

10 references: 2 Soviet and 8 non-Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Cermets and Special Alloys AS UkrSSR)

SUBMITTED: April 28, 1960

Card 3/3

18.1200

S/126/60/010/006/011/022
E193/E483

AUTHOR: Voytovich, R.F.

TITLE: High-Temperature Oxidation of Refractory Alloys. II. The Tungsten-Zirconium Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.6, pp.862-865

TEXT: In continuation of work described in the preceding paper (pp.857-861 of the same issue), the kinetics of oxidation of zirconium and tungsten-zirconium alloys, containing 10, 30 and 70% zirconium, were studied at temperatures between 500 and 900°C. The results indicated that the resistance to oxidation of the tungsten-zirconium alloys is lower than that of unalloyed tungsten or zirconium. The values of constants A and B in the equation $K = A \exp(-B/RT)$, describing the temperature-dependence of the rate of oxidation of the alloys studied, are tabulated below.

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E193/E483

High-Temperature Oxidation of Refractory Alloys.
II. The Tungsten-Zirconium Alloys

Composition	A	B	Temperature Range °C
W - Zr (10%)	1.35	29800	500 - 900
	1.59×10^{-4}	11900	500 - 700
	1.0	39700	700 - 900
W - Zr (30%)	1.23×10^{6}	4900	500 - 900
W - Zr (70%)	5.48×10^{6}	49700	500 - 900

There are 6 figures, 1 table and 7 references: 3 Soviet and 4 non-Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Cermets and Special Alloys AS UkrSSR)

SUBMITTED: April 28, 1960

Card 2/2

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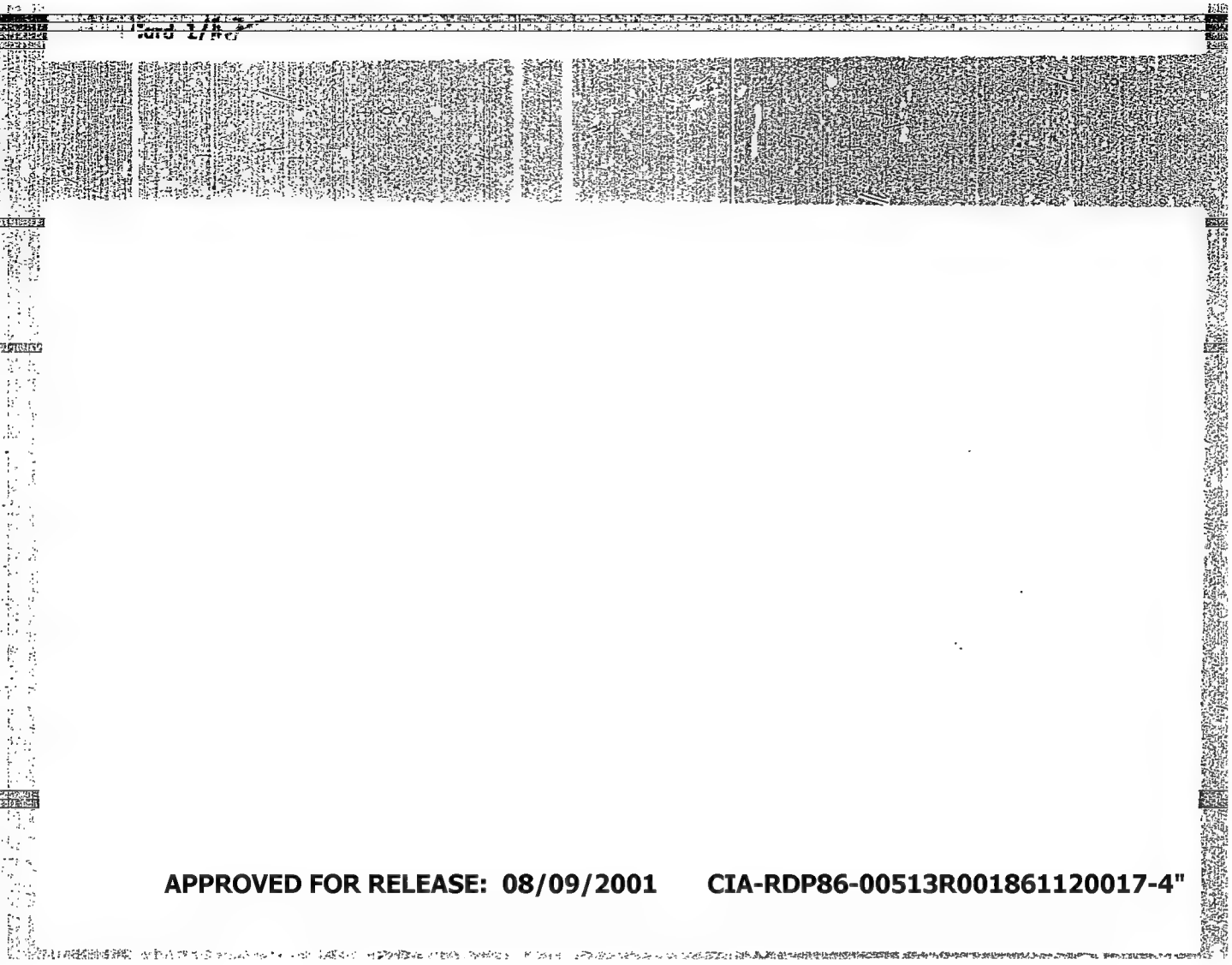

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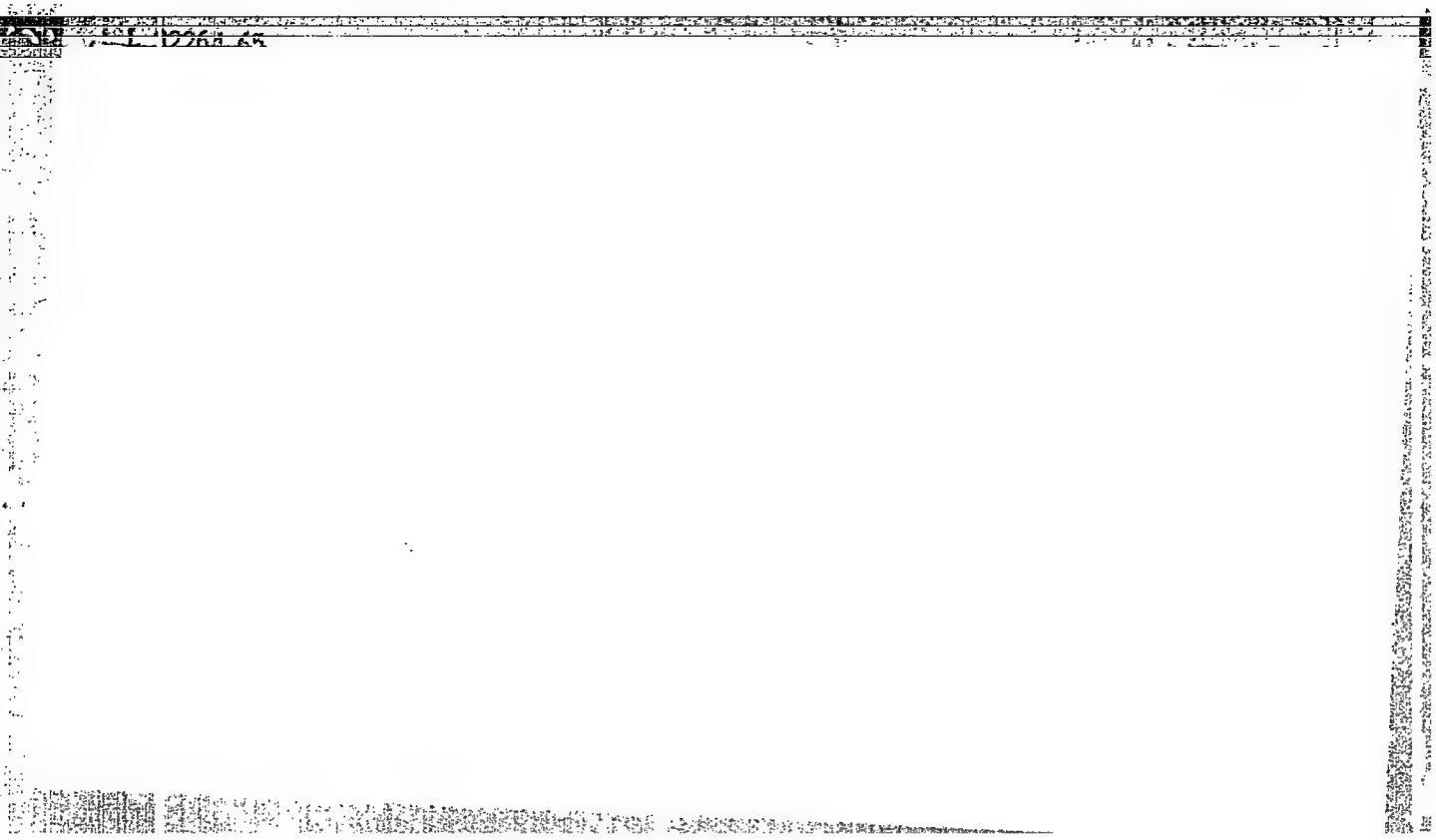

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VOYTOVICH, R.F. (Kiyev)

Oxidability of certain low-melting metals. Izv. AN. SSSR. Otd. tekh. nauk. Met. i topl. no.3:90-95 My-Je '61. (MIRA 14:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Nonferrous metals--Thermal properties) (Oxidation)

18.8300 1496,1454, 2208

28876
S/180/61/000/004/014/020
E021/E580

AUTHORS: Voytovich, R.F. and Makarova, R.V. (Kiyev)

TITLE: Oxidation of alloys of titanium and tantalum with zirconium at high temperatures

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1961, No.4, pp.95-100

TEXT: Alloys were prepared from metals of high purity (Ti 99.99%, Zr - 99.99%, Ta - 99.9%). The kinetics of oxidation were studied by continuous weighing for 12 hours. The measured values of the oxidation (g/cm^2) of TiZr and TaZr alloys are plotted in Fig.2; the top three graphs (a - β) apply to TiZr alloys, the bottom three graphs (2 - e) apply to TaZr alloys. The zirconium contents, in%, were, respectively, 30 (graph a), 70 (graph б), 90 (graph β), 10 (graph г), 30 (graph д) and 70 (graph e). The alloy containing 90% Zr is more oxidation resistant than the others. There is a sharp increase in oxidation rate above 600°C. At lower temperatures, the scale adheres well to the metal. The alloy of low Zr content oxidises only slowly up to 600°C. Above this temperature, there is a sharp increase in

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oxidation. The alloy containing 70% Zr oxidises more uniformly. Fig.3 shows graphs of log K against $1/T \times 10^3$, where K is the constant of the parabolic law of oxidation and T is the absolute temperature. The curves are 1 - Ti + 30% Zr, 2 - Ti + 70% Zr, 3 - Ti + 90% Zr, 4 - Zr, 5 - Ti, 6 - Ta + 10% Zr, 7 - Ta + 30% Zr, 8 - Ta + 70% Zr, 9 - Ta, 10 - Zr. Fig.4 shows oxidation (after 1 hour) against Zr content (in wt.%) for Ti-Zr and Ta-Zr alloys. Thus, alloying of Ti or Ta with Zr results in a sharp decrease in resistance to oxidation, especially at temperatures above 600°C. There are 5 figures, 1 table and 15 references: 5 Soviet and 10 non-Soviet. The English-language references read as follows: Ref.5: Jenkins, A.E. The Study of Oxidation of Titan and its Alloys at High Temperatures. J.Inst. Metals, 1954-55, 84, 1; Ref.9: Mallet, M.W., Albrecht, W.M. The High Temperature Oxidation of two Zr.Sn Alloys. J.Electrochem.Soc. 1955, 102, 407; Ref.10: Wallwork, G.R., Jenkins, A.E. Oxidation of Titanium, Zirconium and Hafnium. J. Electrochem.Soc., 1959, 106,10; Ref.14: Wasilewski, R.J. The Solubility of Oxygen in and the Oxides of Tantalum, J. Amer. Chem. Soc., 1953, 75, 1000.

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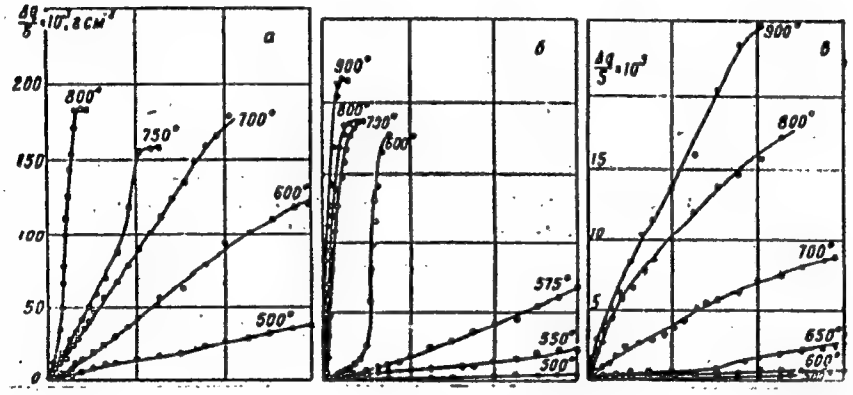
3

Oxidation of alloys of titanium ... 28876
S/180/61/000/004/014/020
E021/E580

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Cermets and Special Alloys AS UkrSSR)

SUBMITTED: June 1, 1960



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3

Fig.2

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S/129/61/000/007/012/016
E073/E535

AUTHOR: Voytovich, R. F.

TITLE: Oxidation Ability of a Work-hardened and Recrystallized Tungsten-Platinum Alloy

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.7, pp.47-48 + 1 plate

TEXT: The author studied the kinetics of oxidation of a work-hardened and recrystallized alloy of tungsten containing 1.5% Pt. The alloy was prepared by precipitating onto 99.98% purity tungsten powder platinum black from a concentrated $PtCl_4$ solution. The specimens were sintered in vacuum for 8 hours at 1600°C and were fused in an arc furnace with a tungsten electrode on a copper cooling base. For eliminating non-uniformities, the alloy was annealed in vacuum for 35 hours at 1250°C. Cylindrical 3 mm diameter, 7 mm high specimens were deformed by a method described by K. Hauffe and J. Block (Ref.3: Z.phys. chem. v.198, 1948). The pressure during deformation of all the specimens was about 270 kg/mm^2; a deformation of 20% (in height) was achieved. As a result of work-hardening, the hardness of the specimens changed

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Oxidation Ability of a Work ... S/129/61/000/007/012/016
E073/E535

from RC = 32.5 to RC = 41.5. The microstructure of the recrystallized alloy is shown on a microphotograph which is reproduced in the paper. Oxidation proceeded for 12 hours at 500-900°C At these temperatures, platinum does not oxidize; the results on oxidation of tungsten are given in a paper by V.A. Lavrenko and I. N. Frantsevich (Ref.1: Voprosy poroshkovoy metallurgii i prochnosti materialov, Issue 6, 112, 1958). The oxidation curves of the alloy are plotted in Fig.2, $g \cdot cm^2$ vs. time, hours (continuous line - work-hardened, dashed line - after recrystallization). The work-hardening reduces sharply the resistance of the alloy to oxidation, particularly at temperatures above 650°C. The constants of the speed of oxidation of the alloy in the coordinates ln K-1/T are plotted in Fig.3 (top scale, temperature, °C; 1 - W + 1.5% Pt, work-hardened; 2 - same alloy, recrystallized). Deformation of the alloy brings about a sharp increase in its oxidation activity. For the work-hardened as well as for the recrystallized alloy, the fracture caused by the phase transition of WO_3 into L_1WO_3 is observed for the same temperature range as for pure tungsten (700°C). The slight addition of Pt

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reduces sharply the resistance of the tungsten against oxidation. In the process of oxidation of the alloy, the oxide PtO_2 dissolves in the tungsten oxide and increases the concentration of vacancies of oxygen ions in accordance with the formula:

$$WO_3 \rightarrow A + E + 1/2\ O_2(gas);$$
$$PtO_2 \rightarrow PtC(W) - 2A;$$
$$PtC(W) \rightarrow PtO_2 + 3A + E + 1/2\ O_2\ (gas),$$

where A - oxygen anion vacancy, E - electron, C - penetrating admixture cathion of a lower valency. The speed of oxidation of the tungsten is determined by the diffusion of oxygen anions along the oxygen vacancies and, therefore, an increase in these in presence of PtO_2 brings about a sharp increase in the scale formation of the alloy. The obtained results are in agreement with data published by Hauffe et al. The following conclusions are arrived at:

1. The influence of work-hardening on high temperature oxidation

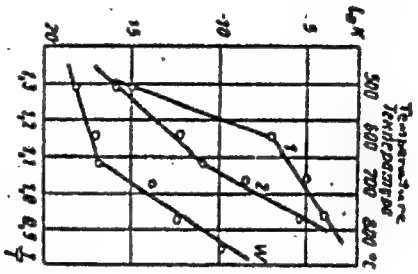
Oxidation Ability of a Work ... S/129/61/000/007/012/016
E073/E535

of a tungsten alloy with 1.5% Pt was proved.
2. It was found that a small addition of Pt produces a sharp drop in the resistance of tungsten against scale formation.
There are 3 figures and 5 references: 2 Soviet and 3 non-Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Cermets and Special Alloys AS UkrSSR)

[Abstractor's Note: This is a complete translation except that Fig.1 has not been included.]

Fig.3



Card 4/8 4

18.12.90 2808, 1454

S/126/61/011/002/006/025
E111/E452

AUTHOR: Voytovich, R.F.

TITLE: High-Temperature Oxidation of High Melting Alloys
III. Alloys of Tungsten With Niobium

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.2, pp.220-223

TEXT: The author reports his study on the oxidation kinetics of tungsten alloys with 10, 30 and 70 wt.% niobium at 500 to 900°C. Such data on these alloys are not now available in the literature, though the oxidation of the pure metals has been studied earlier (Ref.4). The alloys were prepared from 99.98% tungsten and 99.63% niobium by the method already described by the author (Ref.5). The gain in weight in grams per unit surface in cm^2 is plotted against time (hours) in Fig.2, 3 and 4 for alloys with 10, 30 and 70% Nb respectively, for various temperatures. The natural logarithm of the rate constant is plotted against reciprocal of the absolute temperature in Fig.5. As for pure tungsten (Ref.4, 5 and 6; also Ref.7: W.Webb, J.Norton, C.Wagner, J.Elektrochem. Soc.,1956,103,No.2), the phase transition of the α-WO_3 into

S/126/61/011/002/006/025
E111/E452

α'-WO_3 gives a break on the curves at 700°C followed by increasing oxidation rate. In Fig.6, the weight gain per unit surface is plotted against wt.% Nb for various temperatures (additional curves for 700°C are given for 5 and 10 hours). The figure shows that tungsten appreciably improves the scaling resistance of niobium. Change in the concentration of anionic vacancies in the oxide lattice, produced by solution of the foreign oxide and phase transition in tungsten oxides and also the changes in the mechanical properties of Nb_2O_5 films during oxidation, govern the fairly complex laws of the oxidation of alloys of tungsten with niobium. Results of X-ray analysis of oxide phases formed on the alloys indicate that higher oxides of the main component of the alloy are formed preferentially. On the alloy with 70% Nb, the α-Nb_2O_5 phase is formed at 700°C and the β-Nb_2O_5 at 800°C. There are 6 figures, 1 table and 7 references: 5 Soviet and 2 non-Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR)

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E111/E452

High-Temperature Oxidation ...

SUBMITTED: April 28, 1960

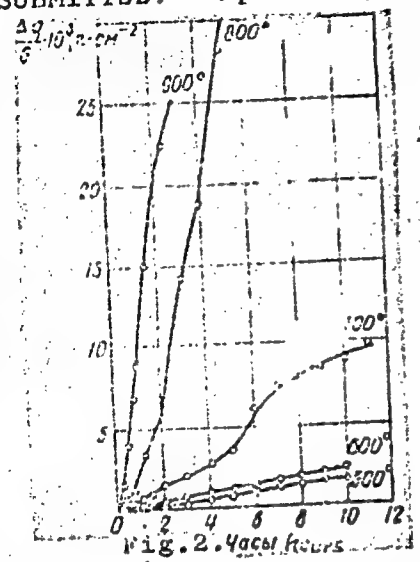

Fig.2. Часы hours

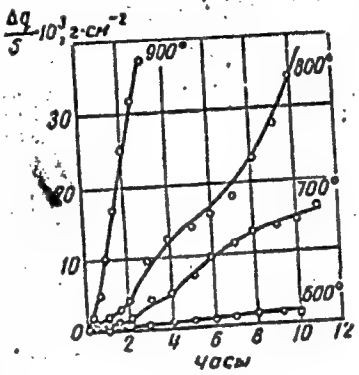

Fig.3.

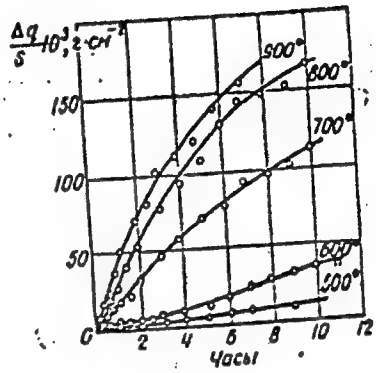

Fig.4.

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High-Temperature Oxidation ...

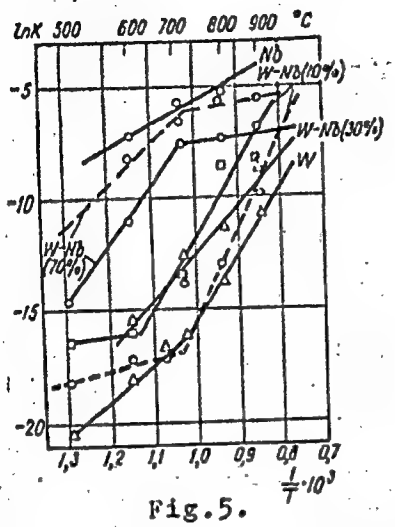

Fig.5.

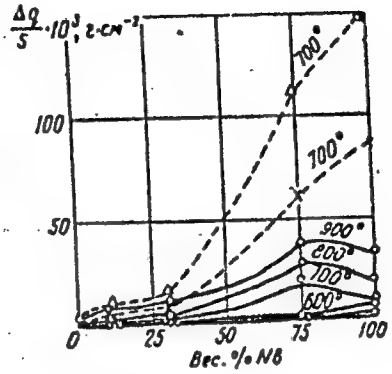

Fig.6.

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30452
S/126/61/012/003/007/021
E202/E380

18.1255

AUTHOR: Voytovich, R.F.

TITLE: High-temperature oxidation of refractory alloys. IV. Tantalum-titanium and tantalum-tungsten alloys

PERIODICAL: Fizika metallov i metallovedeniye, v. 12, no. 3, 1961, 376 - 381

TEXT: The kinetics of the high-temperature oxidation of alloys of Ta (99.98% purity) with W (99.998%) and Ti (99.99%) have been studied experimentally in the temperature range 500 - 900 °C and equations for their temperature-dependence have been calculated. Ta forms, both with Ti and W, a series of solid solutions for which hardness curves are given. Oxidation was estimated by weighing and curves were plotted at different temperatures over 12-hour periods. At certain temperatures some of the alloys (Ta-70% Ti at 600-850 °C and Ta-30% W at 600 °C) showed a low initial (first 4 hours) rate of corrosion, which later increased rapidly. These effects are explained in terms of the mutual solubilities of the various oxide phases. It is shown that 10% Ti or W leads to a sharp

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E202/E380

High-temperature oxidation ....

increase in the scale-formation of tantalum. Small additions of Ta substantially improve the resistance of the latter to scale-formation. Ti or W increases the resistance of Ta to oxidation only when alloyed in excess of 25%.
There are 8 figures, 1 table and 10 references: 4 Soviet-bloc and 6 non-Soviet-bloc. The four latest English-language references quoted are: Ref. 6 - H.W. Maynor, R.W. Swift - Corrosion, 1956, 12, 49; Ref. 8 - J.U. Cathcart, J.I. Campbell, G.P. Smith - J. Electrochem.,Soc., 1958, 105, 442; Ref. 9 - R.J. Wasilewski - J. Am.Chem.Soc., 1953, 75, 1001; L.K.Trevel, H.W. Rinn - Ann. Chem., 1955, 27, 1329.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR)

SUBMITTED: January 31, 1961

Card 2/2

31053
S/126/61/012/004/010/021
E073/E535

18.1152

AUTHOR: Voytovich, R.F.

TITLE: High-temperature oxidation of high-melting point alloys. 5. Alloys of niobium with zirconium and niobium with titanium

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.4, 1961, 576-579

TEXT: Little published information is available on niobium-base alloys and this applies particularly to the scale resistance of alloys of niobium with zirconium and niobium with titanium. The author investigated the influence of additions of zirconium (10, 30, 70 wt.%) and titanium (3, 10, 30 wt.%) on the oxidation of niobium within the temperature range 500 to 900°C for durations of up to 12 hours. The curves of oxidation of the alloys have an unusual shape, indicating a change in the character of the forming oxide layer. Almost all the curves show that the oxidation process has several stages, the final one of which is characterized by higher speeds of scale formation which increases with increasing temperature and duration of the process. This indicates that the

forming oxide layers gradually lose their protective properties. For instance, theZr-Ti alloys have a very low rate of oxidation below 700°C, whilst at higher temperatures the scale formation is very intensive; at 900°C the oxidation curves of all the alloys are approximately linear. Similar results were obtained by J. U. Cathcart, J. I. Campbell and G. P. Smith (Ref.8: J.Electrochem. Soc., 1958, 105, 442) for pure niobium and they attributed this phenomenon to the appearance of tensile stresses in and subsequent cracking of the oxide layer. Although the oxidation process in the final stages proceeds at an almost linear rate, the oxidation rate for some of the alloys obeys a parabolic law in the initial stages. Figs. 7 and 8 show the dependence of the rate of oxidation (g/cm^2) on the niobium content (wt.%) of Nb-Zr alloys (Fig.7) and Nb-Ti alloys (Fig.8) for a one hour exposure; small additions of Zr and Ti bring about an appreciable increase in the resistance to oxidation of niobium. At temperatures up to 700°C the intensity of scale formation of Nb-Zr alloys, containing up to 90% Nb, is almost independent of the composition of the alloy. At 800°C alloys containing over 75% Nb have a high rate of oxidation and

High-temperature oxidation ...

at 900°C even alloys with 30% Nb show intensive scale formation. It can be seen from Fig.8 that titanium additions are more effective in improving the scale resistance than zirconium additions. Thermo-chemical calculations revealed that during oxidation of Nb-Ti alloys the phases TiO_2, and Ti_2O_3 form preferentially, whilst Nb_2O_5 is partially reduced to pure niobium. According to X-ray structural analyses, it was found that the films form during oxidation at 600, 700, 800 and 900°C, consist primarily of higher oxides of the basic components of the alloys. There are 9 figures and 8 references: 2 Soviet-bloc and 6 non-Soviet-bloc. The English-language references read as follows: Ref.1: Anderson C.P., Hayes E.P., Roberson A.H., Kroll W.J. Rep.Invest.U.S. Bureau.Min., 1950, No.4653; Litton J.B. Iron Age, 1951, 167, 95, 112; Ref.3: Rogers B.A., Atkins D.F. J.Metals, 1955, 7, 1034; McPherson D.J. Ibid, 1951, 3, 881; Ref.4: Maynor H.W., Barret B.R., Swift R.E. WADC. Techn. Rep., 54-109, Contract No.H.F. 18(600), Project No.7351, März, 1955. Ref.8: Quoted in text.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR

Card 3/4

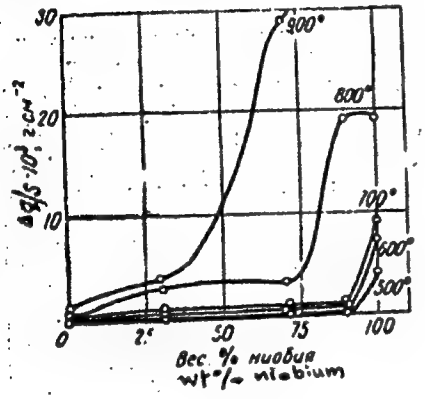
High-temperature oxidation ...

31053
S/126/61/012/004/010/021
E073/E535

(Institute of Cermets and Special Alloys AS UkrSSR)

SUBMITTED: February 4, 1961

Fig.7



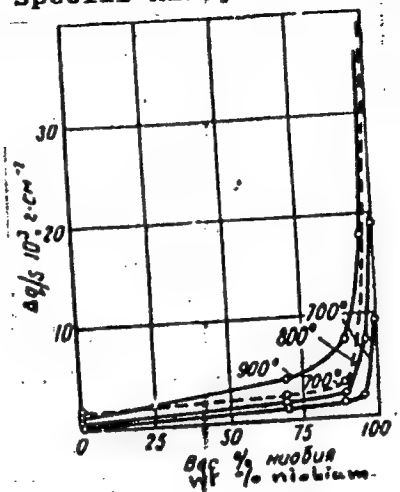


Fig.8

Card 4/4

S/129/62/000/004/007/010
E193/E383

pp. 115-7

AUTHOR: Voytovich, R.F., Candidate of Technical Sciences

TITLE: Effect of work-hardening on oxidation of niobium

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1962, 45 - 48

TEXT: The kinetics of oxidation of niobium containing 0.22% C, 0.31% Fe and 0.04% Ti was studied on both recrystallized and cold-worked (compressed to 30% reduction) specimens, tested at 200 - 800 °C. The rate of oxidation was measured by the continuous weighing method. The results are reproduced graphically in Fig. 1, where the increase in weight ($\Delta q/s.10^4$, g/cm^2) of specimens tested at low (graph a) and high (graph b) temperatures is plotted against time (hours) at temperature, the continuous and broken curves relating, respectively, to recrystallized and cold-worked material. It will be seen that cold plastic deformation of Nb increased its oxidation activity and, as was shown by calculation, increased

Card 1/3

Effect of work-hardening ....

the electrical conductivity of the oxidized layers. The temperature dependence of the oxidation rate is described by:

$$K = 7.39\ e^{-14\ 900/RT}$$

(for recrystallized Nb oxidized at 500 - 900 °C) and by:

$$K = 2.12\ e^{-11\ 900/RT}$$

(for cold-worked material oxidized at 400 - 700 °C). Thin black oxide films formed on Nb at low temperatures (250 - 400 °C) changed into a white powder after some time at high temperatures (400 - 800 °C). To study the mechanism of oxidation of Nb a thin platinum wire was wound tightly around the Nb test piece, which was then oxidized at 600 °C for 4 hours. After the test the platinum wire was found to be located at the oxide/gas interface; this result and the effect of cold-work on the rate of oxidation were taken to indicate that oxidation of

Card 2/4

S/129/62/000/004/007/010
E193/E383

Effect of work-hardening ....

Nb consisted of reactive diffusion through anion vacancies or lattice interstices which took place in an electrical field formed by the metal (oxide)-oxygen couple in a complex electrolyte comprising several oxides. There are 2 figures and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR)

Card 3/4

FRANTSEVICH, Ivan Nikitich, doktor khim. nauk; VOYTOVICH, Raisa Fominichna, kand. khim. nauk; LAVRENKO, Vladimir [redacted] khim. nauk; DEKHTYAR, I.Ya., prof., doktor tekhn. nauk, retsenzent; CHUMACHENKO, T.I., red.izd-va; BEREZOVYY, V.N., tekhn. red.

[High temperature oxidation of metals and alloys] Vysokotemperaturnoe okislenie metallov i splavov. Kiev, Gos.izd-vo tekhn. lit-ry USSR, 1963. 321 p. (MIRA 16:9)
(Oxidation) (Metals at high temperatures)

VOYTOVICH, R.F.; LAVRENKO, V.A.

Oxidation of tungsten-rhenium alloys. Metalloved. i term. obr. met. no.4:50-51 Ap '64. (MIRA 17:6)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

L 34110-66 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AP6012843 SOURCE CODE: UR/0080/66/039/004/0768/0774

52
51
13

AUTHOR: Voytovich, R. F.

ORG: Institute of Materials Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Kinetics of high-temperature oxidation of iron-nickel and copper-nickel alloys

21 21 21

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 4, 1966, 768-774

TOPIC TAGS: iron alloy, copper alloy, nickel alloy, oxidation kinetics, metal scaling, NICKEL CONTAINING ALLOY, TEMPERATURE DEPENDENCE, METAL OXIDATION

ABSTRACT: In order to establish the relationship between the oxidation rate of iron-nickel and copper-nickel alloys and their composition and temperature, the oxidation was studied on specimens of iron and copper containing 10, 30, 50, 70, and 90 wt. % nickel in the 500—900C range at 100C intervals. The alloys were prepared in a vacuum arc furnace, then vacuum-homogenized for 25 hr at 1000C. The oxidation kinetics were studied by continuous weighing in the course of 10 hr. The equilibrium constants were calculated for the following reactions:

UDC: 541.11+546.3-19'72'74/56'74

Card 1/2

L 34110-66

ACC NR: AP6012843

$$NiO + 3FeO \rightleftarrows Fe_3O_4 + Ni, \quad (1)$$
$$4NiO + 3Fe \rightleftarrows 4Ni + Fe_3O_4, \quad (2)$$
$$Ni + 2CuO \rightleftarrows NiO + Cu_2O, \quad (3)$$
$$3Fe_2O_3 + Ni \rightleftarrows NiO + 2Fe_3O_4, \quad (4)$$
$$Ni + CuO \rightleftarrows NiO + Cu, \quad (5)$$
$$3NiO + 2Fe \rightleftarrows Fe_2O_3 + 3Ni, \quad (6)$$
$$Ni + Cu_2O \rightleftarrows NiO + 2Cu, \quad (7)$$
$$NiO + Fe \rightleftarrows Ni + FeO, \quad (8)$$
$$NiO + 2FeO \rightleftarrows Fe_2O_3 + Ni. \quad (9)$$

The temperature dependence of these constants was determined. These calculations showed that during the oxidation of iron-nickel alloys, FeO and iron are oxidized to higher oxides (Fe_2O_3 and Fe_3O_4) in the scale layer, while NiO is reduced to pure nickel. In the case of copper-nickel alloys, the penetration of the univalent Cu^+ ion into the NiO lattice reduces the concentration of defects in the latter and thus decreases the oxidation rate. It is concluded that alloying of iron and copper with nickel substantially improves the oxidation resistance of these metals, and that the oxidation decreases monotonically with rising nickel content of the alloy. Orig. art. has: 4 figures and 1 table.

SUB CODE: 07, 11 / SUBM DATE: 16May64 / OTH REF: 017

Card 2/2

L 28027-66 EWT(m)/EPF(n)-2/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6015741 (N) SOURCE CODE: UR/0073/66/032/005/0445/0448

45
B

AUTHOR: Voytovich, R. F.

ORG: Institute of Problems of Material Science AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Effect of chromium on the oxidation kinetics of niobium

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 32, no. 5, 1966, 445-448

TOPIC TAGS: niobium, niobium alloy, chromium containing alloy, oxidation, alloy oxidation

ABSTRACT: The oxidation of niobium alloy with 10,30,50,70, or 90% chromium at 500,600,700,800 or 900C has been studied. The alloys were melted in a vacuum arc furnace with a tungsten electrode from 99.8%-pure niobium and electrolytic chromium. Alloy specimens were homogenized at 1000C for 20 hr. Chromium was found to decrease somewhat the strength of niobium, but to increase sharply the resistance against oxidation, particularly at temperatures up to 800C. The alloy with a chromium content over 30% showed a slight weight gain at all temperatures in 10-hr tests (see Fig. 1). Chromium promotes the formation of β-niobium pentoxide and shifts the upper limit of

2

Card 1/2 UDC: 546.76:541.127:542.943:546.882

L 28027-66

ACC NR: AP6015741

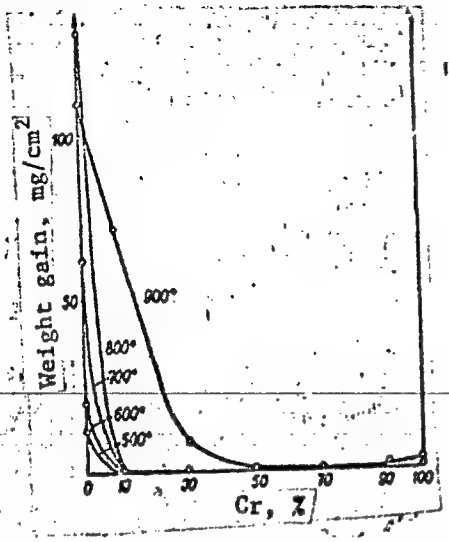


Fig. 1. Composition dependence of the oxidation of niobium-chromium alloys at the temperatures indicated in 10-hr tests.

α-phase stability from 900C for pure niobium to 600C for Nb+10%Cr alloy. In the presence of chromium, a new oxide phase is formed -- apparently $CrNbO_4$ oxide -- which slows down the diffusion of oxygen through the oxide layer. Orig. art. has: 4 figures and 1 formula. [AZ]

SUB CODE: 11/ SUBM DATE: 23Jul64/ ORIG REF: 002/ OTH REF: 005/ ATD PRESS: 4261

Card 2/2

L 23071-66 EWT(m)/EPF(n)-2/EWP(t) IJP(c) JD/WW/JG
ACC NR: AP6011013 SOURCE CODE: UR/0080/66/039/003/0565/0572

AUTHOR: Voytovich, R. F.

ORG: none

TITLE: Scale formation on iron-copper and iron-cobalt alloys heated in air

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 3, 1966, 565-572

TOPIC TAGS: alloy, iron copper alloy, iron cobalt alloy, alloy oxidation

ABSTRACT: The oxidation of iron-copper and iron-cobalt alloys containing 10, 30, 50, 70, and 90% copper or cobalt in air at 500—900C has been investigated. With increasing copper content the oxidation resistance increases, reaches a maximum at approximately 50% copper, and then decreases to that of unalloyed. At copper contents from 30 to 70% the intensity of scale formation changes very little (see Fig. 1). Similar behavior was observed in the case of cobalt. In all the alloys tested, a sharp increase in the intensity of oxidation was observed at temperatures over 700C. Orig. art. has: 7 figures. [WW]

Card 1/2

L 23071-66
ACC NR: AP6011013

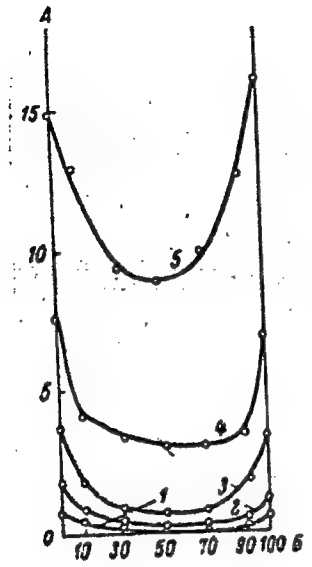


Fig. 1. Composition dependence of weight gain in iron-copper alloys during 12-hr tests at 500 (1), 600 (2), 700 (3), 800 (4), and 900C (5).

SUB CODE: 11/ SUBM DATE: 25Dec63/ ORIG REF: 003/ OTH REF: 007

ATD PRESS: 4234

Card 2/2

VOYTOVICH, R.F.

Oxidation of alloys of niobium with copper and zirconium with copper. Zhur. fiz. khim. 39 no.5:1112-1115 My '65. (MIRA 18:8)

1. Institut problem materialovedeniya AN UkrSSR.

VOYTOVICH, R.F.

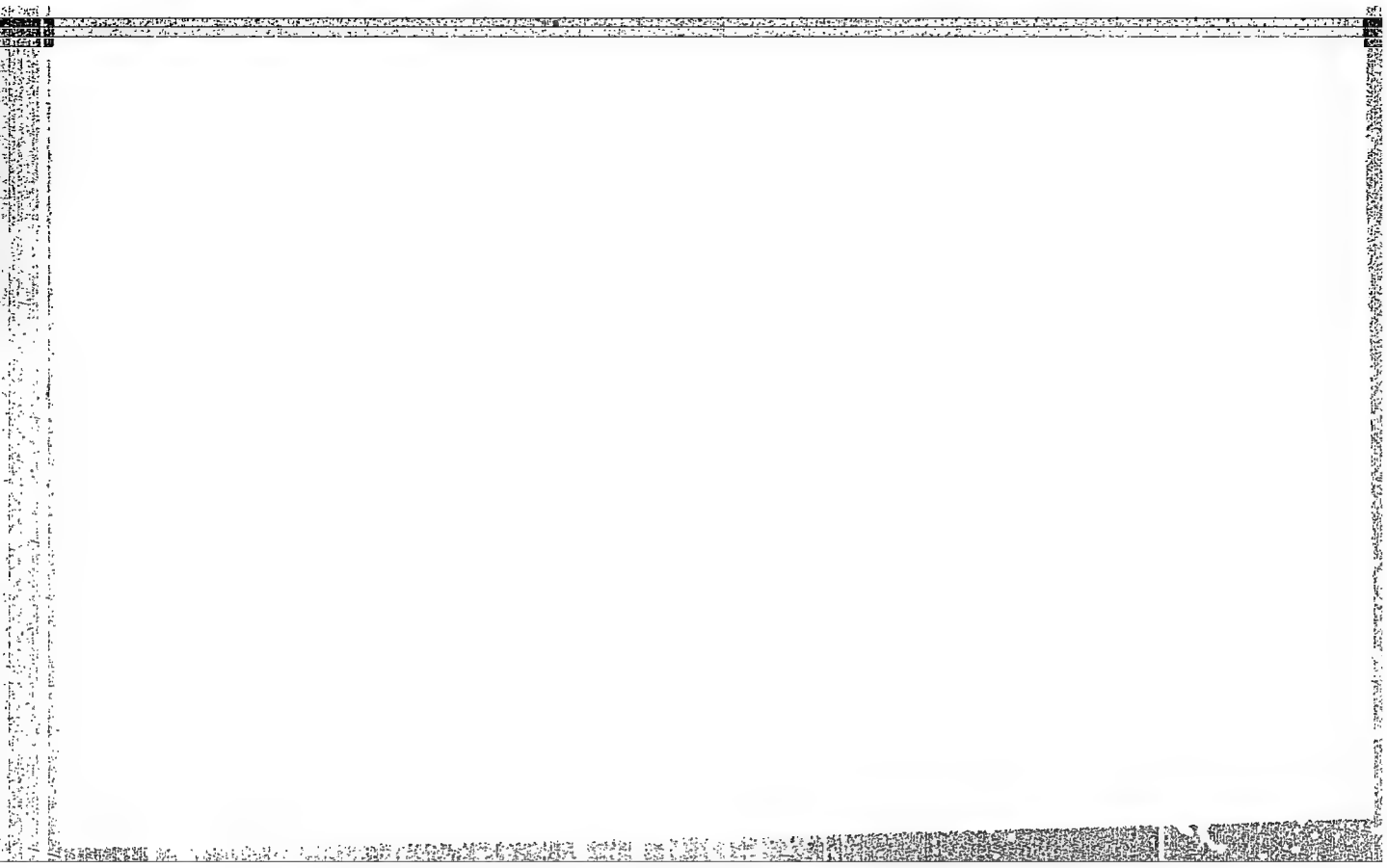
Processes of oxidation of scandium, yttrium, and praseodymium at high temperatures. Ukr. khim. zhur. 31 no.6:550-553 '65. (MIRA 18:7)

1. Institut problem materialovedeniya AN UkrSSR.

VOYTOVICH, R.F.

Oxidation of iron alloys with aluminum and copper alloys with aluminum. Zhur. prikl. khim. 38 no.4:946-949 Ap '65. (MIRA 18:6)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.



APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001861120017-4"

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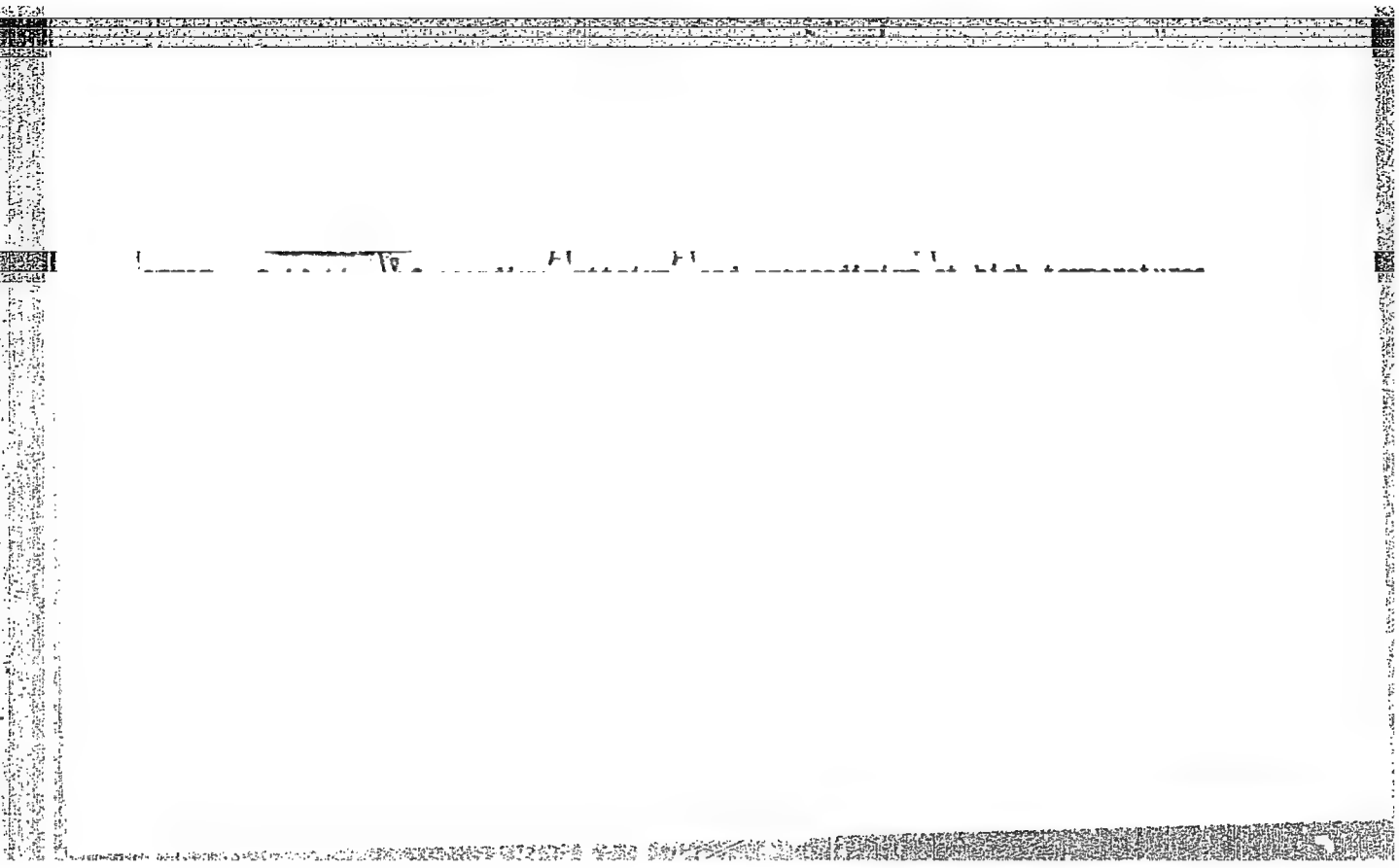
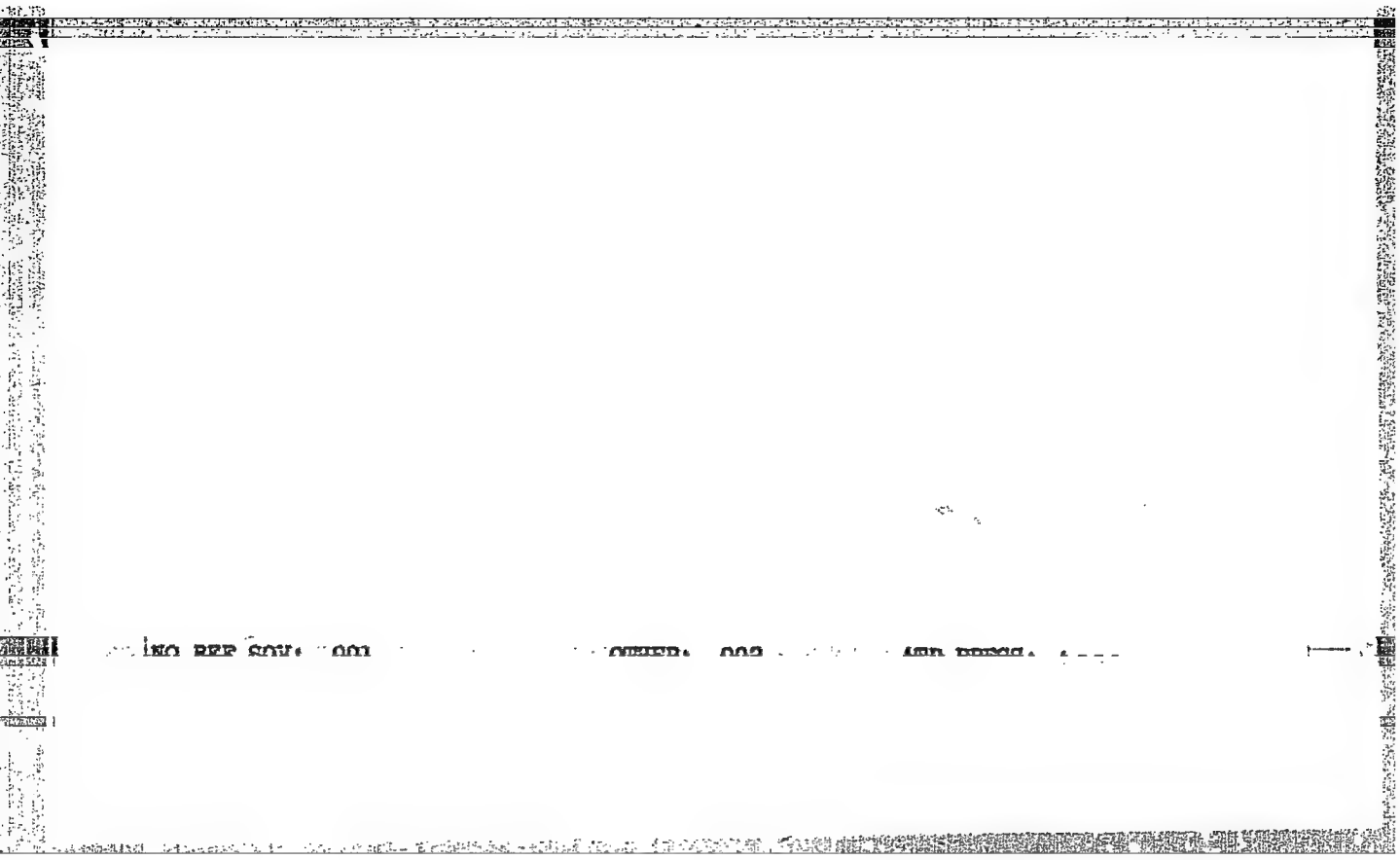
VOYTOVICH, R.F. (Kiyev)

High temperature oxidation of high-melting alloys. Tantalum-iron and tantalum-cobalt alloys. Zhur. fiz. khim. 39 no.3:588-591 Mr '65. (MIRA 18:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

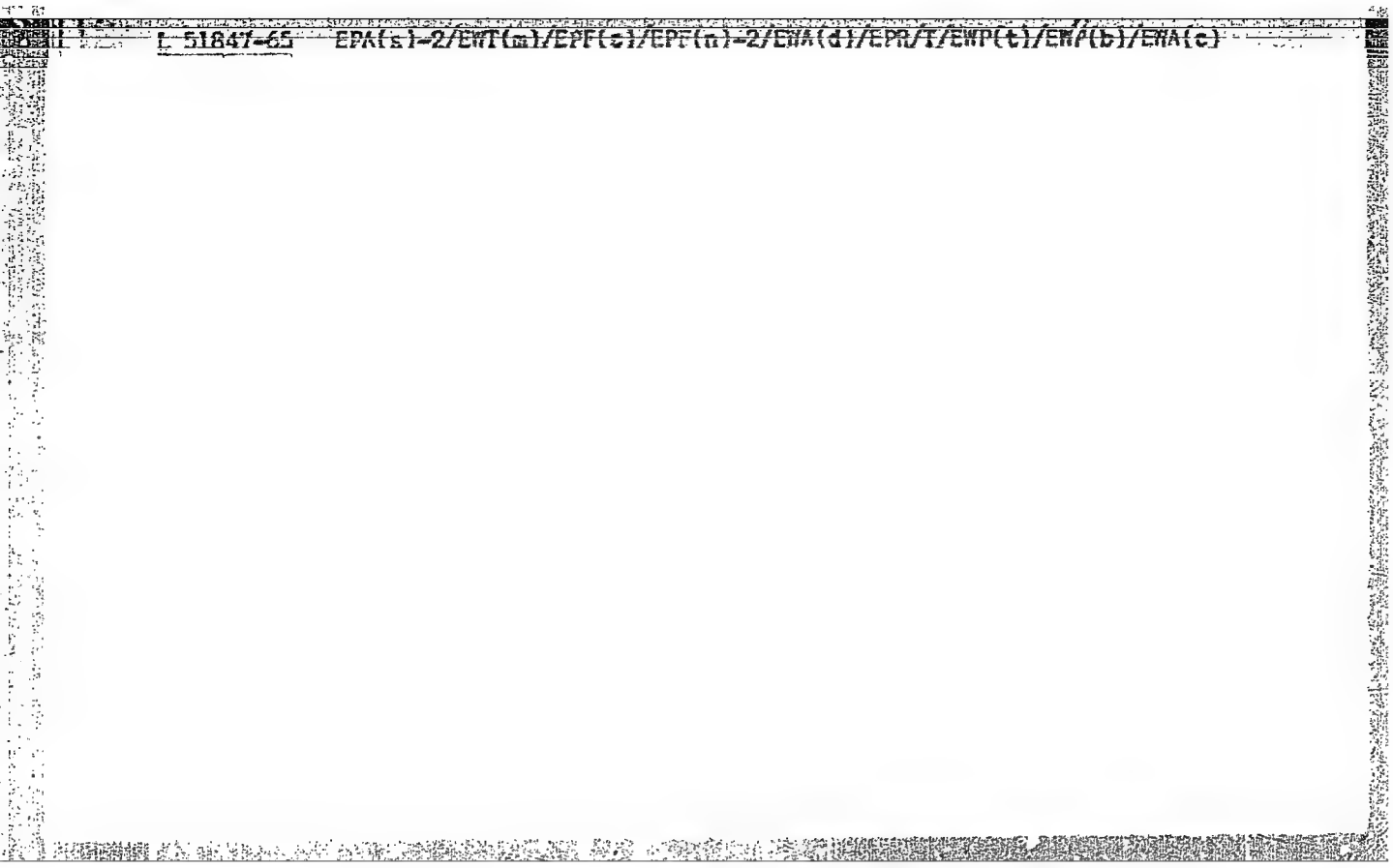




VOYTOVICH, R.F.

Oxidation kinetics of high-melting niobium-nickel and niobium-aluminum alloys. Zhur. fiz. khim. 38 no.12:2954-2957 D '64. (MIRA 18:2)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.



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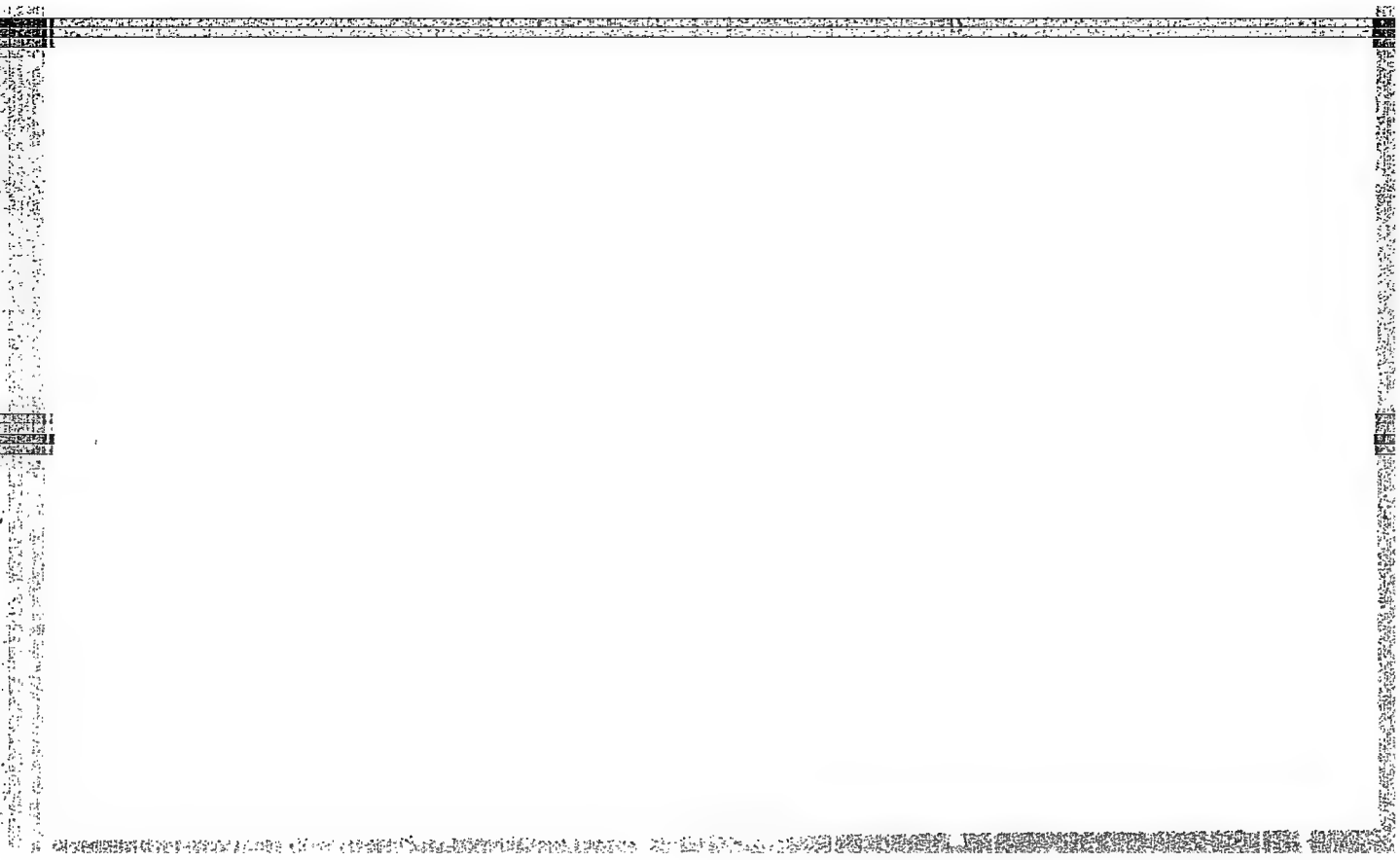

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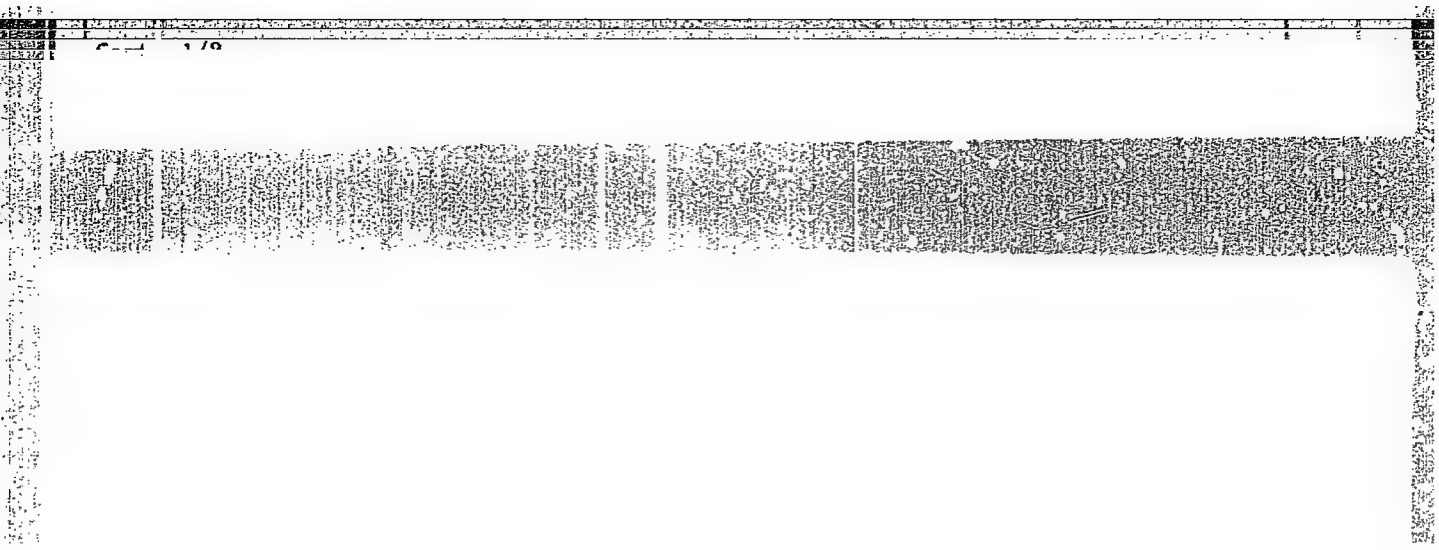

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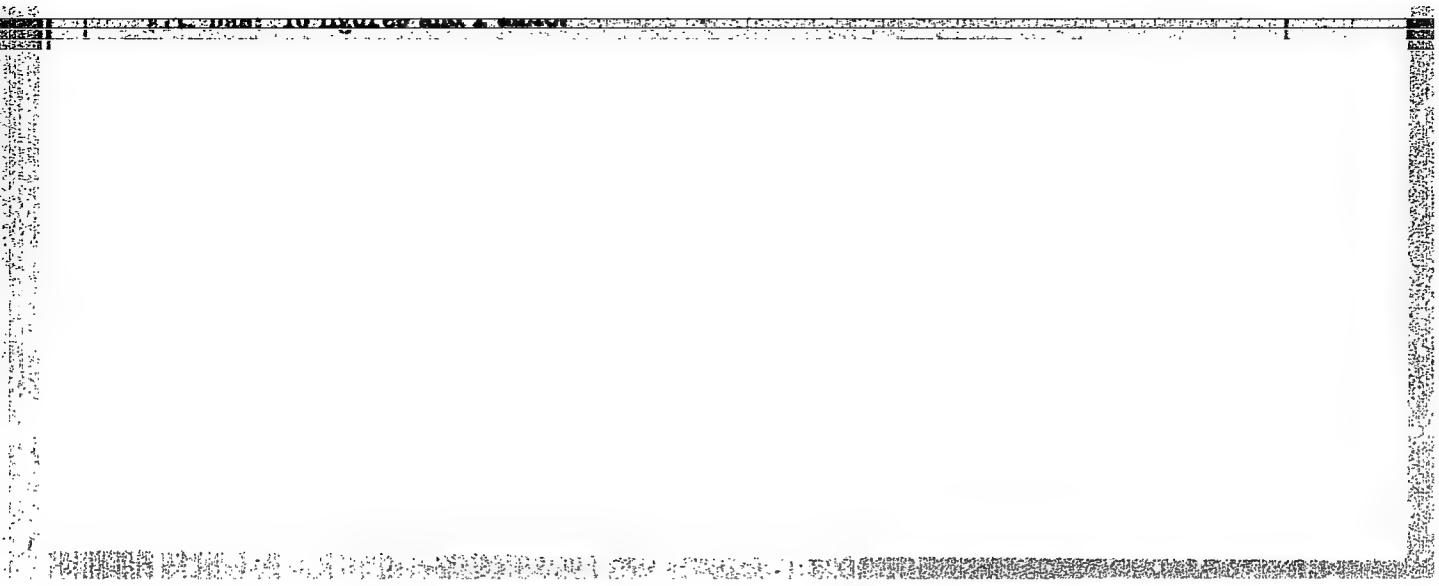

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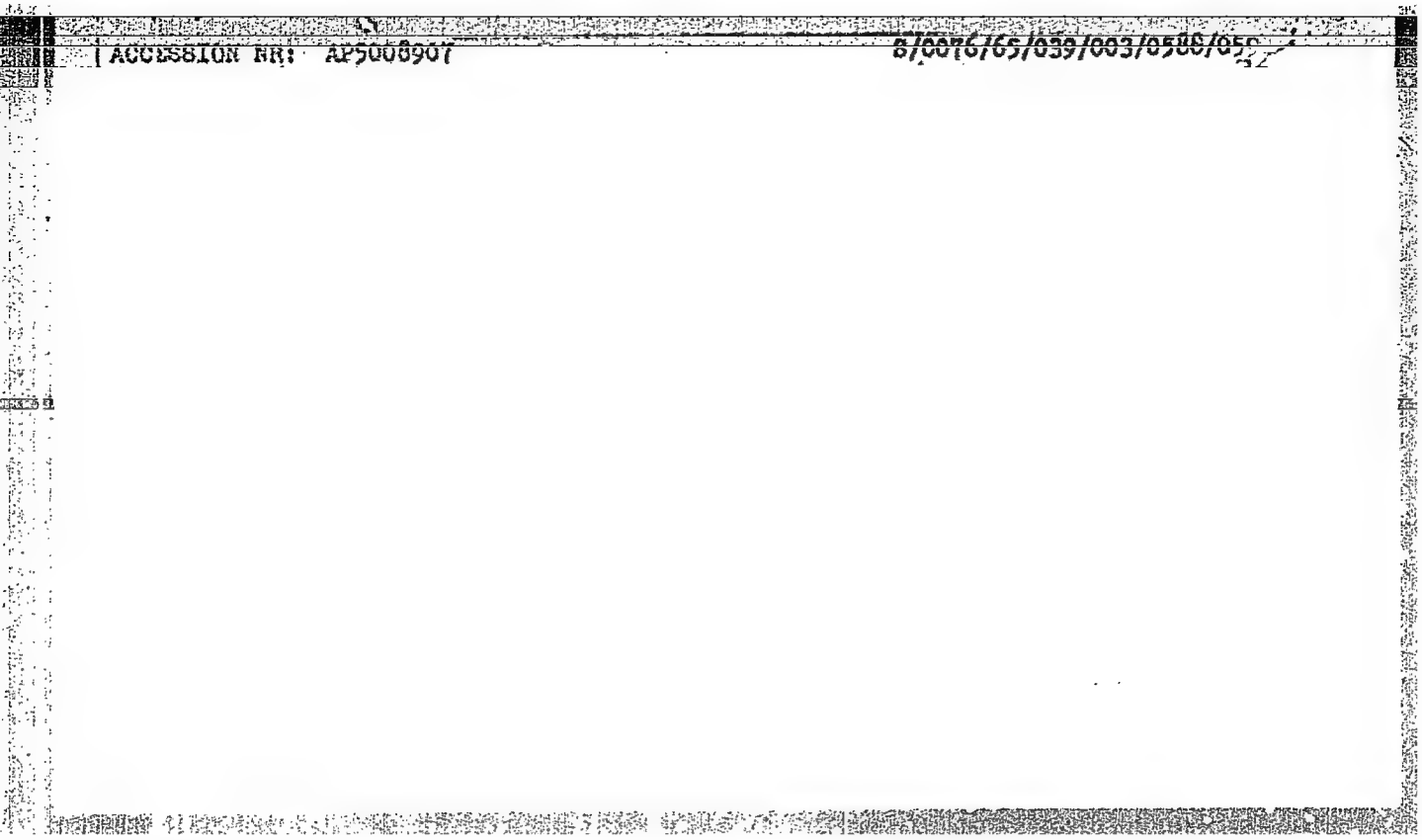

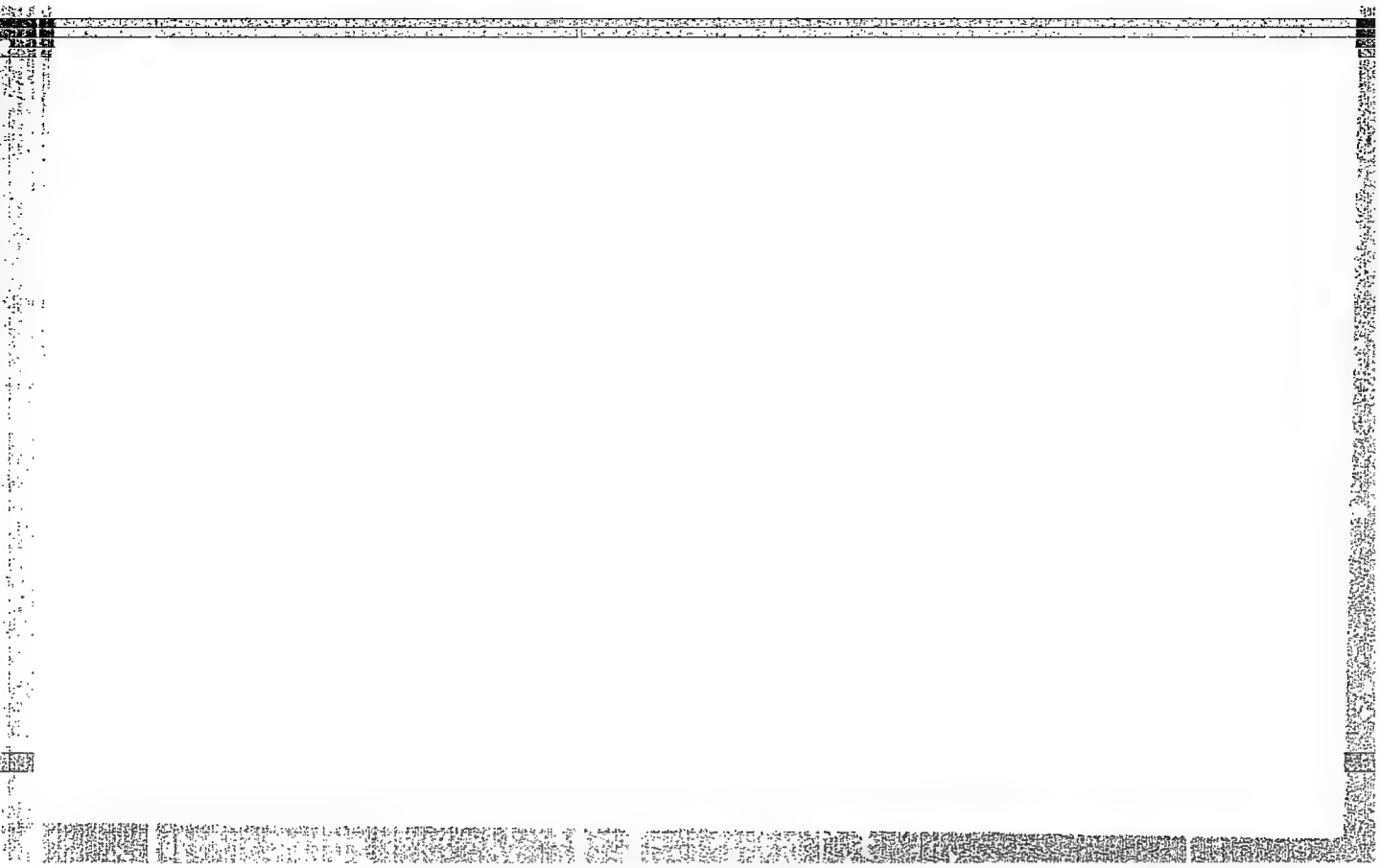

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placement of niobium ions in the Nb_2O_5 lattice by ions of [illegible]

[illegible] compounds in niobium alloys

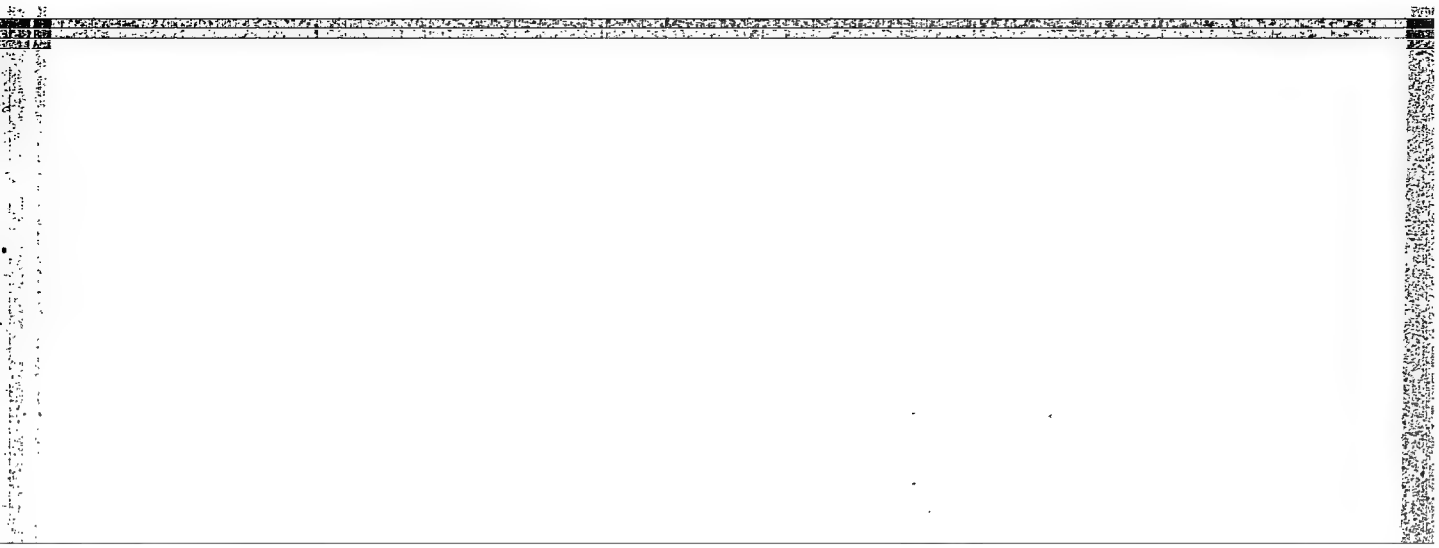
U.S. [illegible]

ACCESSION NR: [illegible]

AUTHOR: Voytovich, R. F.; Lavrenko, V. A.

B

[illegible]-rhenium alloys



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S

BOOK EXPLOITATION

AM4008911

Frantsevich, Ivan Nikitich (Doctor of Chemical Sciences); Voytovich, Raisa Fominichna (Candidate of Chemical Sciences); Lavrenko, Vladimir Alekseyevich (Candidate of Chemical Sciences)

High-temperature oxidation of metals and alloys (Vysokotemperaturnoye okisleniye metallov i splavov), Kiev, Gostekhizdat USSR, 1963, 321 p. illus., biblio. 1,000 copies printed.

TOPIC TAGS: metal physics, high temperature oxidation, refractory metals, tungsten, molybdenum, tantalum, rhenium, refractory compounds, oxide coating, cermet coating, halogen medium, diffusion, crystal lattice defect, corrosion

PURPOSE AND COVERAGE: The book examines the theory of high-temperature oxidation of metals and alloys from the viewpoint of modern physics of solids and the chemistry of crystal lattice defects. In addition to a critical presentation of the theoretical concepts, the results of experiments by the authors on the kinetics of scale formation on refractory metals and alloys and the first systematic presentation of the oxidation of materials by gases containing sulphur, halogens, corrosion by flash, oxidation of refractory compounds, and anti-corrosion coatings

Card 1/3

AM4008911

are included in the book. The book is intended for employees of research institutes and plant laboratories; it can also be used by engineers in other fields and by students in higher educational institutions.

TABLE OF CONTENTS [abridged]:

Card 2/3

AM4008911

SUB CODE: ML SUBMITTED: 27 Mar 63 NR REF SOV: 088

OTHER: 451 DATE ACQ: 6 Jan 64

Card 3/3

KANTOR, M.Y.; VOYTOVICH, S.A.

Concreting domes and shells by wet gunite. Transp. stroi. 14 no.1:29-31 Ja '64. (MIRA 17:3)

1. Glavnyy tekhnolog tresta Moselektrotyagstroy (for Kantor).

VOYTOVICH, S.A., inzh.; KANTOR, M.Ya., inzh.

Erecting a reinforced-concrete frame during the reconstruction of the Yaroslav Station in Moscow. Transp. stroi. 14 no.4:27-29 Ap '64. (MIRA 17:9)

VOYTOVICH, V.

Plastics, by B.A. Arkhangel'skii. Reviewed by V. Voitovich.
Rech. transp. 21 no.12:56 D '62. (MIRA 15:12)
(Plastics)
(Arkhangel'skii, B.A.)

VOYTOVICH, V.

"Machine parts made of capron" by R. N. Podshivalov, N. I. Suslov. Reviewed by V. Voitovich. Mashinostroitel' no.10:47 O '62. (MIRA 15:10)

(Nylon) (Podshivalov, R. N.) (Suslov, N. I.)

VOYTOVICH, V.A.

Protection of electrolytic bath suspensions.
Mashinostroitel' no.11:31 N '62. (MIRA 15:12)
(Electroplating--Equipment and supplies)

S/123/61/000/022/013/024
A004/A101

AUTHORS: Voytovich, V.A., Kitayeva, L.I., Berdinkova, V.V., Kuznetsova, T.V.

TITLE: Anticorrosion protection of metal parts by plastics. Report I. Practice of using the ГЭН-150 (В) (GEN-150[V]) elastomer

PERIODICAL: Referativnyy zhurnal. Mashinostroyeniye, no. 22, 1961, 79, abstract 22B477 ("Tr. Proyektn. tekhnol. i n.-i. in-ta. Gor'kovsk.sovnarkhoz", 1960, no. 2 (4), 35 - 37)

TEXT: The authors describe a new anticorrosion coating, the GEN-150(V) elastomer, representing a composition of nitrile caoutchouc and a special synthetic resin. Prior to heat treatment the material dissolves well in acetone, benzene, toluol or ethyl acetate. The elastomer solution can be applied by a brush, by pouring, spraying or dipping. If the coating is applied by spraying a 5% acetone solution of the elastomer is used. Spraying is effected with a sprayer designed by the Konstantinovka "Avtosteklo" Plant. The application of the coating by other methods requires a 15-20% solution in benzene, toluol, ethyl acetate or P-4 (R-4) solvent. The metal surface is prepared for the coating in the following way: sandpaper cleaning, degreasing, careful drying. To

Card 1/2

Anticorrosion protection ...

obtain a dense coating, 4 - 5 elastomer layers are applied. The first layer is held at room temperature for 2 hours (at 50°C for 1 hour). The second and subsequent layers are applied in the same way, the final top layer is held in air for 2 - 3 hours, at 50°C for 1 hour and at 150°C for 2 hours. The obtained film possesses an adhesion to steel and aluminum of 35 kg/cm^2, does not break at repeated bending through 360°C and does not lose its properties during a 200-hour holding in oil at 150°C.

N. Savina

[Abstracter's note: Complete translation]

Card 2/2

YAVORSKIY, A.K.; VOYTOVICH, V.A.

Adhesive for securing ultrasonic transformers during design testing.
Zav. lab. 31 no.2:252 '65. (MIRA 18:7)

1. Gor'kovskiy inzhenerno-stroitel'nyy institut.

RAZUVAYEV, G.A.; PETUKHOV, G.G.; SHUBENKO, M.A.; VOYTOVICH, V.A.

Exchange reactions in the thermal and photodecomposition of organometallic compounds. Ukr. khim. zhur. 22 no.1:45-47 '56.(MLRA 9:6)

1.Gor'kovskiy gosudarstvennyy universitet.
(Organometallic compounds) (Ion exchange)

36767
S/081/62/000/001/064/067
B119/B101

1.1600

AUTHORS: Voytovich, V. A., Kitayeva, L. I., Berdnikova, V. V., Kuznetsova, T. V.

TITLE: Protection against corrosion of metal parts by plastics. Communication I. Experience with the application of ГЭН-150 (B) (GEN-150(V)) elastomer

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 1, 1962, 530, abstract 1P193 (Tr. Proyektn. tekhnol. i n.-i. in-ta. Gor'kovsk. sovnarkhoz, no. 2(4), 1960, 35 - 37)

TEXT: The ГЭН-150 (B) (GEN-150(V)) elastomer is composed of nitrile rubber and synthetic resin (whose composition is not given). A 15% solution of it in P-4 (R-4) solvent with a viscosity of 57 sec measured with ВЗ-4 (VZ-4) was applied in 4 or 5 layers onto the purified, degreased steel or aluminm surface. After each application, drying was performed at 18 - 23°C for 2 hrs, and at 50°C for 1 hr, and the finished piece kept at 150°C for 2 hrs. An irreversible covering with good adhesion and high stability to water, oil, gasoline, weak acids and alkalis, H_2S, and SO_2 was obtained, which

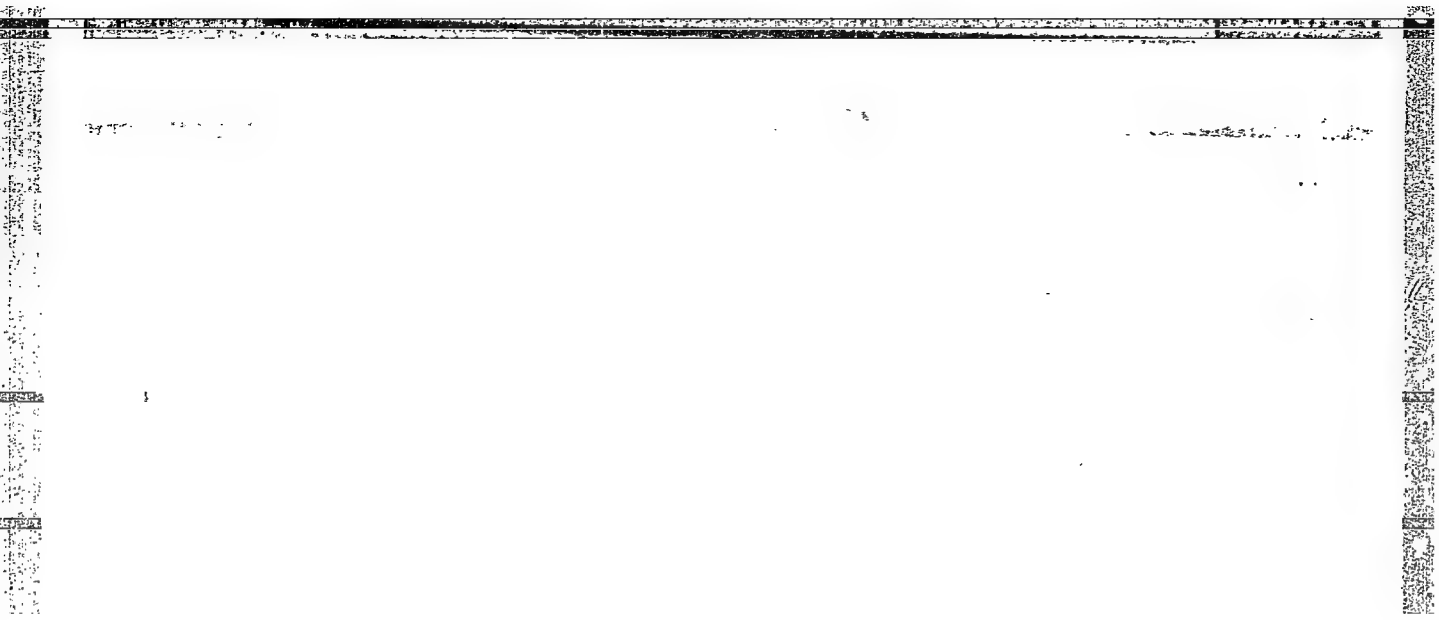
Card 1/2

Protection against ...

S/081/62/000/001/064/067
B119/B101

maintained its properties even after 200-hr storing in oil at 150°C. The covering is used as corrosion protection for underwater parts of ships, the lower side of truck mudguards, and a number of parts in mills. [Abstracter's note: Complete translation.]

Card 2/2



APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001861120017-4"

USSR

Author

Title

Periodical

Abstract : An investigation was conducted to determine the relation between the nature of the distribution in a filtering layer of an ionite chromatographic

separation of rare earth elements

acid, ion exchange

TRANSLATION: Complexes of the [illegible] cation of a lanthanide [illegible] are formed when elay-

lenediaminetetraacetic acid solutions [illegible] pH values. Such complexes appear in the filtrate when the column with the Ln form of the cation exchange resin [illegible] with a solution of ammonium [illegible] of the rare earth fractions [illegible] the fil-trate depends on the ratio of the [illegible] ns of the elements in the solvent

Card 1/2

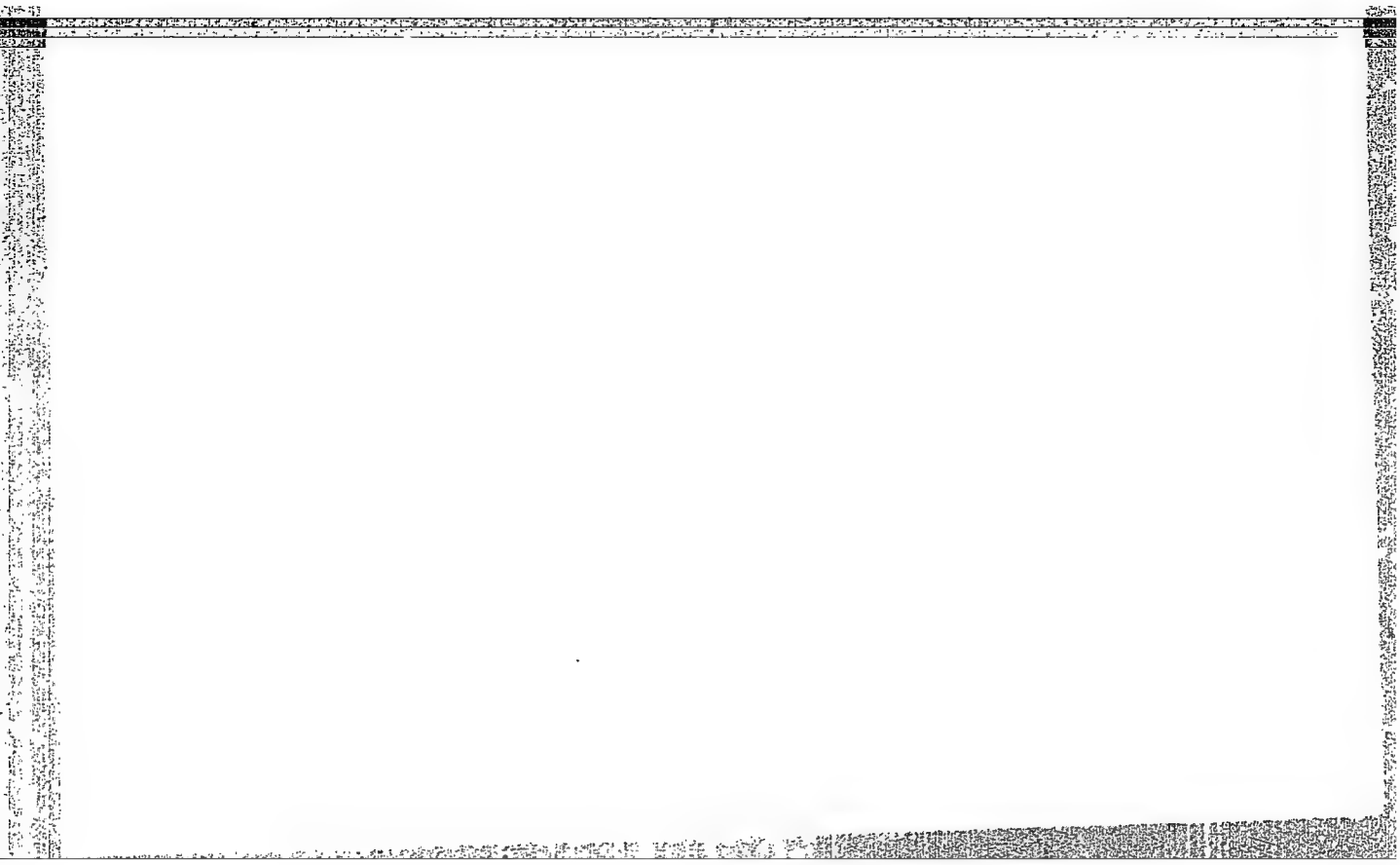
ACCESSION NR: AR4004[illegible]

In the title, solution and the difference in the instability constants of the complexes formed [illegible]

4

DATE ACQ: 19Jun63 SUB CODE: CH ENCL: 00

Card 2/2



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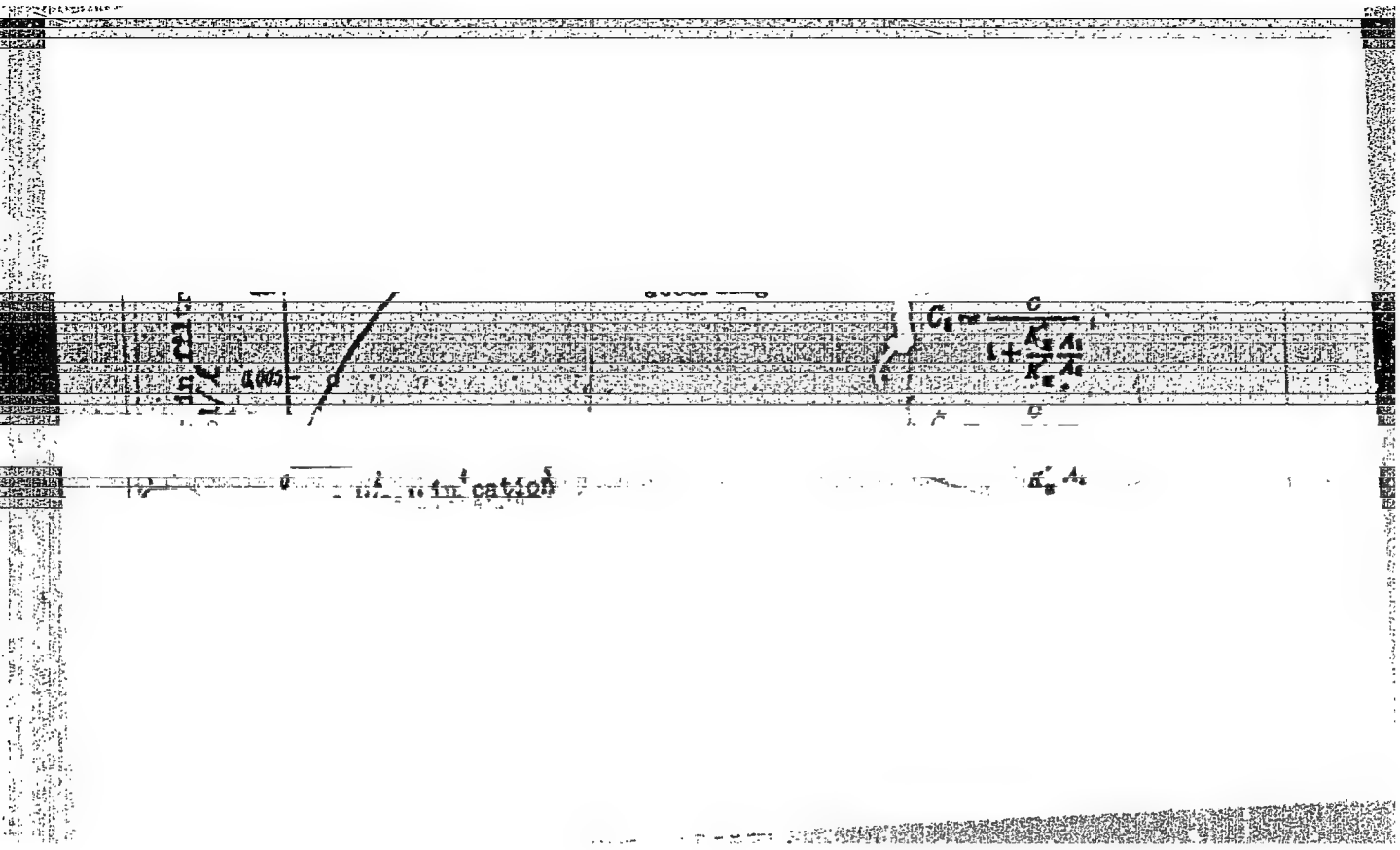

MEDVEDEVA, P.A.; GAVURINA, R.K.; KEVESH, A.A.; VOYTOVICH, V.K.

Cold curing of epoxy polyester resins. Plast.massy no.3:17-19 '64. (MIRA 17:3)

ACCESSION NR: AP4018160 S/0191/64/000/003/0017/0019

AUTHOR: Medvedeva, P.A.; Gavurina, R.K.; Kevesh, A.A.; Voytovich, V.K.

TITLE: Cold curing of epoxy-polyester resin

SOURCE: Plasticheskiye massy*, no. 3, 1964, 17-19

TOPIC TAGS: epoxy polyester resin, curing, hardening, curing agent, inflammable fiberglas , self extinguishing fiberglass, initiator, accelerator, cold curing

ABSTRACT: The process of cold curing (at 18-22C) epoxy-polyester resin (EPR) (a mixture of epoxy ED-5 or ED-6 resin, styrene, and unsaturated polyester resins) was studied. The process is feasible with 2 types of mixed three-component curing agents: (1) organic peroxide + aromatic tertiary amine + organic dicarboxylic acid anhydride, or (2) organic hydroperoxide + organic salt of a variable valence metal + organic dicarboxylic acid anhydride. By varying the ratio of the initiator and accelerator components of the hardening agent, the curing time can be varied from 2-3 hours or more to 8 minutes. Inflammable fiberglas samples were prepared using

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ASTT(b)S-8/3 glass cloth with an EPR (ED-5 + polyester made from ethylene glycol, maleic, and phthalic anhydrides and adipic acid) and benzoyl peroxide, dimethylaniline, and maleic or methyltetrahydrophthalic anhydrides. Heat treatment at 125C for 5 hours and subsequently at 160C for 5 hours gave fiberglas with high mechanical strength, especially high static bending (4500-4800 kgs/cm^2). Self-extinguishing fiberglas samples prepared similarly from chlorine-containing polyesters also had fairly high mechanical strength (static bending 3800-4400 kgf/cm^2). "S. Ya. Lapteva participated in the experimental work." Orig. art. has: 5 tables

ASSOCIATION: None

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